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AUGUST 1962

Sravana-Bhadrapad 1884 Saka

OFFICE OF THE PRINCIPAL RURAL EXTENSION TRAINING CENTRE
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Vol. X

No. 5

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OUR COVER :—**THE SEASON'S BOUNTY**

Editorial

PEOPLE'S PARTICIPATION IN CATTLE DEVELOPMENT

In modern age, the State is entering various fields of life. Increasing claims are being made on the State to be responsible for the execution of different plans of national development, projects for economic progress; and all these schemes and programmes are directed towards the welfare of its constituent units—that is, the individuals.

In India as well, the sphere of State activity for the health, education, industrial development, agricultural progress and so on and so forth, is progressively increasing. No doubt, without proper planning, active initiative and execution by the State, the economic or social development of a vast country like ours may appear to be inconceivable especially in the background of prevailing general un-developed conditions.

But one fact. Every tendency is prone to move towards its absolute form if the development of its growth goes unrestrained without proper checks and balances. And, this is now being progressively realised that if the State is allowed to proceed with perpetually increasing field of activities, this may lead to automatization of individual's behaviour. Moreso, this automatization may prove to be a negative force in the smooth working of the State itself because any systematic organisation with "half-living" automatic cogs will be devoid of real vigour and basic force of dynamism.

It is, therefore, essential that the individuals, the mass of people constituting the State should be actual and conscious participants in what the State does and what it proposes or plans to do.

That is applicable to every aspect of planning.

In the sphere of cattle development and animal husbandry also, the actual cow keepers and the peasants should be active participants in the programmes launched in this field. They should indicate their requirements and the basic planning emerging from local levels should take into consideration these needs. In the sphere of dairy development projects, the cow-keeper should be an integral part of these projects. Any scheme, bigger or smaller, launched for cattle development must also take into consideration the problems that they face, the level of understanding and 'know-how' they possess, their acceptability; and ultimately they should be the basic initiators of the plan. That would bring forward the vigour of their urges and the dynamism of a living organism.

PRICING THE MARKET MILK

DAIRYING in India is rarely practised as a specialised occupation being generally a subsidiary occupation to agriculture. Over 80% of the country's human population and about 95% of the milch animals and inhabited in the rural areas. Dairying can, therefore, be regarded as mainly a rural cottage industry; the cultivator normally keeping, along with a pair of bullocks, one or two milch animals and the milk in excess of the needs of the family being disposed of. It has been estimated that roughly 17% (9% fluid and 8% in the form of products) of the total produce is retained by the producer.

The market being not guaranteed and the returns being not fair, the producer does not take much interest for higher milk production and seldom follows the hygienic methods for the production of milk. To have plentiful supply in the urban consuming centres, it is of utmost importance that the rural producer is provided with an incentive in the form of higher returns and better marketing facilities so that more milk could be made available for consumption in these areas at resonable prices. Therefore, the problem that generally confronts Dairy Economists and Statisticians is that of pricing the market milk. The problem has three main aspects :—

(1) What price should the producer get ? Producer's price,

(2) What price should the consumer pay ? Consumer's price.

(3) What should be the portion of dealer ? Intermediary's share.

While dealing with the producer's price it is to be kept in view that the producer must get the total expenditure incurred by him for producing the milk plus a fair return on his capital investment, risk involved and his managerial duties to enable him to continue in the industry. If the returns are not attractive, he won't take sufficient interest in the business which will be hinderance towards increased milk production. The fixation of producer's price has thus to be guided by the estimation of the cost of production of milk. So long as an individual does not lose, he may continue the business as a temporary measure in the hope of better conditions in the future. As he cannot be expected to work under unfavourable conditions for long, in order to keep him in the industry, he must be paid price that will atleast cover the cost of production. For

By
Shri T R Puri
and
Shri S M Gupta
National Dairy Research Institute, Karnal

increasing the production to have plentiful supply, he must be given an incentive in the form of higher price and better marketing facilities to enable him to take up expensive planning e.g. better feeding, sanitary housing, better management etc. to save the animals from attack of disease and make them better dairy animals.

Though, as compared to other countries advanced in dairying, Indian producer is paid sufficiently higher prices for his produce due to higher cost of production, the peculiar conditions prevailing in the country viz. seasonal variations in supply of milk, unsatisfactory marketing facilities, the poor quality of milch animals; higher feed costs and unscientific methods of breeding and maintenance of dairy herds, a very little margin is left for the producer, even though the consumer has to pay sufficiently high prices.

To engage himself in market milk production, which appears to be better paying, the producer has to provide for certain sanitary conditions to increase the keeping quality of his milk. His expenses increase when he diverts his produce to the market for fluid consumption rather than selling it to creameries or converting it into ghee. In case the producer happens himself to be the distributor he will have to manage for the transport of the milk from his farm to the market. The commodity, being a perishable one, must be sold within a limited time otherwise it means a heavy loss to the farmer if it gets contaminated. It is therefore, necessary that quick and cheap transport connecting the milk pockets with the consuming urban areas, are provided.

The producer has also to provide for suitable containers, as the milk is subject to test by health authorities within the limits of the city. He may also have to take a license and provide for some other formalities for which he is required to incur some expense and has also to take risk for the unsold portion of the produce. This surplus milk is diverted to less remunerative channels.

To enable the producer to take interest in the trade, he must be paid for all these expenses and risks involved including the expenses of production and a fair return on the capital outlay, additional labour involved, and also to compensate for the losses on the produce sold at cheaper rates.

Seasonal variation is another factor which affects the producer's economy. Proper arrangement for the disposal of surplus milk during the flush season will help the producer considerably to stablise his business.

On the other extreme concerned with the market milk is the consumer with whom rests the final consumption of milk. About 36 to 40% of the total produce is consumed in the fluid form. The consumer offers the price for a product based on the marginal utility of that product. This is the point where the utility obtained by the consumer in consuming a commodity is equal to the loss of utility in the form of money paid towards its price; any further purchase being uneconomic to the consumer the demand may go down.

The price in the market is normally determined by the inter-action of the laws of of Demand and Supply, the price of milk being subject to the same economic laws. Milk being a perishable commodity commands only a short period market. As it cannot be stored, when the supply exceeds the demand for being utilised at such time when the demand is more, the consumer normally commands an upper hand.

During summer season, the demand for fluid milk as well as for its products highly increases, whereas the production goes down as a majority of buffaloes are dry there being

seasonal calvings in this species.

A production calendar for buffalo milk, which clearly indicates that the production is lowest in the months of May to July and highest in October and November, is given at the end of the article.

As the life of unprocessed milk in summer season is shorter its transport to longer distances becomes difficult. It leaves a wide gap between the demand and supply; the supply being much in short than the demand resulting in the increase in prices. Milk is drawn to the consuming centres from distant producing areas after chilling to prolong its life as it becomes economical even to bear the processing as well as long distance transport charges and other expenses due to the higher prices.

On the onset of rainy season, the demand goes down whereas the production starts increasing, resulting into competition among the producers. The excess supply over the demand coupled with the perishable nature of the commodity makes the situation worse. Though the price reduction to a certain extent is reasonable in view of the increased milk production, availability of plentiful cheap green feed stuffs for the animals, the conditions of excess supply over the demand further bring down the prices. The prices of other products also go down and the surplus milk diverted to these channels fetches low price resulting in loss to the producer.

The situation would be much better if the consumers and producers had direct contact in the trade of market milk. There are numerous and various types of intermediaries who are actively engaged in the market milk industry. Although Co-operative societies are gaining popularity but a major portion of market milk is still dealt with by individual intermediaries in India. These dealers act either as distributors or collectors or both. In the former case the producer himself manages to deliver the produce to the dealer. Each dealer establishes his contact with a number of producers who regularly supply the milk at a predetermined price settled between the two. The entire produce is accepted by the dealer relieving the producer from the burden of finding customer every day and there is no problem of surplus milk. Thus he can concentrate his energies towards increasing his production. This dealer has to find market for selling the fluid milk, taking upon himself the risk of price fluctuation in the market and deal suitably with the surplus milk. He also acts as a financier to the producer and grants credit to the customers to increase his sale. This assistance helps the farmer to increase the strength of his animals, carry out breeding programmes, and provide medical and management facilities for the herd. The producer, thus finds a ready market and the consumer gets milk for his consumption at his door.

Some dealers even manage to collect the milk from the producers' door, the latter finding a secured market at home. The entire produce is accepted by the dealer and himself arrange for its transport.

So far the producers were unorganised and had no idea about the market conditions, they were at the mercy of these dealers who exploited them in various ways—charging high rate of interest on capital advances, buying milk at very low rates, excess measures for buying the milk; all these malpractices led to discontent among the producers, and gave rise to co-operatives. Producers in order to safeguard themselves from the bad practices of the dealers, avoid competition and secure better prices for their produce, organised themselves into producer's co-operatives. These co-operatives render various services to their members,

arrange for the collection of the produce from the producers' doors, bargain and secure better prices from the dealers or milk supply schemes, secure credit facilities to the producers, supply cheap feed stuffs to the members after buying them in bulk at wholesale prices.

It has been observed that about 40 percent of the consumers' price goes to the intermediaries, the rest 60% being the producer's share. The huge magin between the producer's and consumer's price is thus being bridged with these cooperatives. The producer gets better price for his produce and the consumer gets the milk at a reasonable rate and is assured of the quality. There is thus need for more of these co-operatives to make the industry flourish. Unless there is a ready market for dairy produce at remunerative rates which is possible only with the elimination of the intermediaries who exploit the occupation in India as at present. The present trend of the gradual replacement of the intermediaries by co-operatives, especially is areas where milk supply schemes are coming up, indicates a bright future for the industry.

PRODUCTION CALENDER FOR BUFFALO MILK

	January	February	March	April	May	June	July	August	September	October	November	December
E. Punjab						L				H		
Delhi					L						H	
Rajasthan						L				H		
Bombay							L				H	
Mysore						L					H	
Travan-core					LH			L			H	
Madras					L						H	
Hydera-bad					L							H
Bihar & Orissa				L					H			
Assam			H					L				

H=Highest Productions L=Lowest Productions.

SORGHUM

RESPONDS TO FERTILISERS

OF all the fodder crops grown in the Panjab Sorghum (Jowar-or-Chari) is the most important. Not only it is a highly nutritious forage but is admirably suited to both irrigated and barani conditions of the State. It can withstand long periods of drought and high temperatures which are unsuited to the growth of Maize. Though its best growth is secured under hot and humid climate, it can grow well under a very wide range throughout the State.

Jowar assumes special importance in the low rain-fall areas for forage, so much so, that zamindars associate the well being of their livestock to this crop to the same extent as the well being of human beings is associated with the wheat crop.

In view of its popularity and importance in the farm economy, work with a view to develop its superior varieties as well as to establish better agronomic practices have been under way at the Fodder Research Section of the Department of Agriculture, Punjab for the last many years. Varieties suited to different climatic zones have been placed on the list of improved seeds of the Department. No. 20 a non-sweet variety with thin stalk and lax ear has become popular in the low rain fall areas of the State. No. 29 another nonsweet, medium thick stalked variety is suited to high rain fall areas because of its ability to resist the attack of red leaf spot. Another variety No. 263 very sweet and juicy, with medium thick and medium tall stalk is greatly suited to the irrigated areas of the State.

Though yield is closely related to the inherent ability of the variety and the climate, it is greatly controlled by the agronomic factors such as soil, use of fertilizers and availability of moisture etc.

It is usually in the light soils that water and nutrient contents are insufficient especially when the demand of the crop is the greatest. In view of this crop does best on medium loan to heavy soils. But intensity with sorghum removes water and nutrients from the soil makes it a very exhaustive previous crop. The interpolation of a fallow and heavy manuring are therefore essential for obtaining a satisfactory yield of the following crop.

By :
Shri H.C. MALIK Dy. DIRECTOR OF AGRICULTURE, PUNJAB

Barani areas, where water is a factor limiting the yield, manuring is only of subsidiary importance. It was however evident from the results of the experiments carried out to find the efficacy of various fertilizers for sorghums that fertilizer mixture of 6 : 10 : 6 was the best but under irrigated conditions further dressings of Nitrogen upto 40 Lbs. N per acre could enhance forage yield by 15-20%. Heavy manuring prior to sowing accelerates rapid growth in the early stages and enables very high yields in addition to combating weeds. Sorghums would make highly luxuriant growth with high dozes of fertilizers ranging from 200 to 250 Lbs. of 8 ; 8 ; 8 ; or 5 ; 10 ; 10 with a top dressing of 40-50 Lbs, N when the crop is just about 12″ high. In short use of single and balanced fertilizers, as detailed below, wlll enable at least 20-25% more yields of forage and grain per acre :

(i) **Single Fertilizers** :—

1. N 30-40 Lbs. (150-200 Lbs. Sulphate of Ammonia 20% of N)
2. P 205 30-40 Lbs. (75-350 Lbs, Super Phosphate 18% P 205)
3. K 20 30-40 (50-65 Lbs. nuriate of Potash (60% K 20)

(ii) **Balanced Fertilizers** :
200 Lbs. of 6 ; 8 ; 6

These are rough guides and may be modified according to the quality of soil, irrigation facilities and the time of sowing.

Time of sowing in the Punjab State has a great influence on the growth and yield of Sorghums. Crop sown early in the season i.e. in April makes stunted growth due to hot and dry conditions during May, June while crop sown in June grows during monsoon and makes luxuriant vegetative growth.

Crop for seed is sown still late in the season i.e. by the end of July, which makes vegetative growth during monsoons but flowers at a period when rains are over. The crop which ears and flowers during rains is primarily suited for forage and the other for grain. Forage yield, as high as 800-1000 Mds. per acre have been obtained in the former and grain as high as 30 Mds. per acre have been obtained from the latter on well prepared fertilized soil and sown at the proper time. ●

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Contd. from the Previous Issues

NINTH ALL-INDIA LIVESTOCK CENSUS (1961)

ABSTRACT STATEMENT OF CATTLE AND BUFFALOES

MADRAS

S. No.	Item	1961 Census (Numbers)	1956 Census (Numbers)	Percentage of increase (+) or decrease (–) of Col. 3 over Col. 4	
1	2	3	4	5	
1.	**CATTLE**				
	(a) Males over 3 years				
	(i) *Used for breeding only*	32,489	39,226	(–)	17.17
	(ii) *Used for breeding & work both*	609,825	—		—
	(iii) *Used for work only*	4,139,929	3,908,020	(+)	5.94
	(iv) *Others*	291,797	273,802	(+)	6.57
	Total	5,074,040	4,221,048	(+)	20.21
	(b) Females over 3 years				
	(i) *Breeding*				
	(a) *In milk*	1,156,017	1,161,663	(–)	0.52
	(b) *Dry & not calved even once*	1,575,745	1,558,149	(+)	1.16
	(ii) *Working*	655,594	557,590	(+)	17.58
	(iii) *Others*	260,662	167,900	(+)	55.16
	Total	3,648,018	3,445,302	(+)	5.89
	Young Stock	2,095,269	2,031,901	(+)	3.10
	Total Cattle	10,817,327	9,698,251	(+)	11.54
2.	**BUFFALOES**				
	(a) Males over 3 years				
	(i) *Used for breeding only*	33,207	19,310	(+)	71.97
	(ii) *Used for breeding and work both*	93,232	—		—
	(iii) *Used for work only*	281,456	226,967	(+)	24.01
	(iv) *Others*	43,777	37,691	(+)	16.15
	Total	451,672	283,968	(+)	59.06
	(b) Females over 3 years				
	(i) *Breeding*				
	(a) *In milk*	625,190	555,001	(+)	12.65
	(b) *Dry & not calved even once*	516,953	435,443	(+)	18.72
	(ii) *Working*	92,530	41,062	(+)	125.34
	(iii) *Others*	59,251	27,232	(+)	117.58
	Total	1,293,924	1,058,738	(+)	22.19
	(c) Young stock	828,522	698,238	(+)	18.66
	Total Buffaloes	2,574,118	2,040,944	(+)	26.11

S. No.	Item	1961 Census	1956 Census	Percentage of increase (+) or decrease (−) of col. 3 over col. 4
1	2	3	4	5
1.	**CATTLE**			
	(a) Males over 3 years			
	(*i*) *Used for breeding only*	27,509	46,204	(−) 40.5
	(*ii*) *Used for breeding & work both*	179,230	—	—
	(*iii*) *Used for work only*	3,328,290	3,222,629	(+) 3.3
	(*iv*) *Others*	178,116	151,047	(+) 17.9
	Total	3,713,145	3,419,880	(+) 8.6
	(b) Females over 3 years			
	(*i*) *Breeding*			
	(*a*) *In milk*	1,126,655	1,183,230	(−) 4.8
	(*b*) *Dry & not calved even once*	1,934,652	1,724,570	(+) 12.2
	(*ii*) *Working*	353,627	267,350	(+) 32.3
	(*iii*) *Others*	118,227	33,682	(+) 251.0
	Total	3,533,161	3,208,832	(+) 10.1
	(c) Young Stock	2,412,803	2,336,981	(+) 3.2
	Total Cattle	9,659,109	8,965,693	(+) 7.7
2.	**BUFFALOES**			
	(a) Males over 3 years			
	(*i*) *Used for breeding only*	16,713	17,477	(−) 4.4
	(*ii*) *Used for breeding & work both*	39,951	—	—
	(*iii*) *Used for work only*	257,406	248,606	(+) 3.5
	(*iv*) *Others*	18,519	14,703	(+) 25.9
	Total	332,589	280,786	(+) 18.4
	(b) Females over 3 years			
	(*i*) *Breeding*			
	(*a*) *In milk*	773,345	767,562	(+) 0.8
	(*b*) *Dry & not calved even once*	852,486	648,373	(+) 31.5
	(*ii*) *Working*	23,944	17,872	(+) 34.0
	(*iii*) *Others*	35,572	25,023	(+) 42.2
	Total	1,685,347	1,458,830	(+) 15.5
	(c) Young Stock	1,004,034	929,097	(+) 8.1
	Total Buffaloes	3,021,970	2,668,713	(+) 13.2

S. No.	Item	1961 Census (Numbers)	1956 Census (Numbers)	Percentage of increase (+) or decrease (—) of Col. 3 over Col. 4	
1	2	3	4	5	
1.	**CATTLE**				
	(a) Males over 3 years				
	(i) Used for breeding only	37,140	23,344	(+)	59.1
	(ii) Used for breeding & work both	298,973	—		
	(iii) Used for work only	4,705,671	4,554,218	(+)	3.3
	(iv) Others	216,695	264,855	(—)	18.2
	Total	5,258,479	4,842,417	(+)	8.6
	(b) Females over 3 years				
	(i) Breeding				
	(a) In milk	1,179,771	1,431,349	(—)	17.6
	(b) Dry & not calved even once	2,345,532	2,070,539	(+)	13.3
	(ii) Working	280,545	168,718	(+)	66.3
	(iii) Others	260,498	91,564	(+)	184.5
	Total	4,066,346	3,762,170	(+)	8.1
	(c) Young Stock	2,955,953	2,671,963	(+)	10.6
	Total Cattle	12,280,778	11,276,547	(+)	8.9
2.	**BUFFALOES**				
	(a) Male over 3 years				
	(i) Used for breeding only	26,520	62,744	(+)	57.7
	(ii) Used for breeding & work	105,891	—		
	(iii) Used for work only	1,193,249	991,826	(+)	20.3
	(iv) Others	67,917	47,148	(+)	44.1
	Total	1,393,577	1,101,718	(+)	26.5
	(b) Females over 3 years				
	(i) Breeding				
	(a) In Milk	1,541,872	1,585,954	(—)	2.8
	(b) Dry & not calved even once	1,438,337	1,185,314	(+)	21.3
	(ii) Working	63,562	58,256	(+)	9.1
	(iii) Others	127,935	46,291	(+)	176.4
	Total	3,171,706	2,875,815	(+)	10.3
	(c) Young Stock	2,399,974	1,990,100	(+)	20.6
	Total Buffaloes	6,965,257	5,967,633	(+)	16.7

S. No.	Item	1961 Census (Numbers)	1956 Census (Numbers)	Percentage of increase (+) or decrease (—) of Col. 3 over Col. 4	
1	2	3	4	5	
2.	**CATTLE**				
	(a) Males over 3 years				
	(*i*) *Used for breeding only*	11,213	11,026	(+)	1.7
	(*ii*) *Used for breeding & work both*	27,613	—		—
	(*iii*) *Used for work only*	504,270	553,155	(—)	8.8
	(*iv*) *Others*	26,132	31,718	(—)	30.7
	Total	569.228	601,899	(—)	5.4
	(b) Female over 3 years				
	(*i*) *Breeding*				
	(*a*) *In milk*	434,541	396,375	(+)	9 6
	(*b*) *Dry & not calved even once*	644,614	575,269	(+)	12.2
	(*ii*) *Working*	14,253	7,083	(+)	101.2
	(*iii*) *Others*	39,354	19,223	(+)	104.7
	Total	1,132,762	997,950	(+)	13.5
	(c) Young stock	984,452	910,527	(+)	8.0
	Total Cattle	2,686,442	2,510,376	(+)	7.0
2.	**BUFFALOES**				
	(a) Males over 3 years				
	(*i*) *Used for breeding only*	3,082	4,046	(=)	23.8
	(*ii*) *Used for breeding & work both*	11,398	—		—
	(*iii*) *Used for work only*	256,848	247,313	(+)	4.0
	(*iv*) *Others*	6,567	5,895	(+)	11.4
	Total	277,895	257,254	(+)	8.2
	(b) Females over 3 years				
	(*i*) *Breeding*				
	(*a*) *In milk*	60,584	61,336	(—)	1.2
	(*b*) *Dry & not calved even once*	61,627	63,752	(—)	3.3
	(*ii*) *Working*	8,253	10,109	(—)	18.4
	(*iii*) *Others*	5,784	3,288	(+)	75.9
	Total	136,248	138,485	(—)	1.6
	(c) Young stock	71,285	91,914	(—)	22.4
	Total Buffaloes	485,428	487,653	(—)	0.5

NINTH ALL INDIA LIVESTOCK CENSUS
1961

S.No.	*Name of the State*	*Bullocks*	*Bullocks (Buffaloes)*	*Tractors*
1.	Andhra Pradesh	4,705,671	1,193,249	2,460
2.	Himachal Pradesh	382,439	515	4
3.	Kerala	504,270	256,848	1,174
4.	Madhya Pradesh	87,92,540	10,84,216	2,047
5.	Minicoy Mindivi Islands.	1	Nil	Nil
6.	Orissa	3,612,513	461,557	265
7.	Bihar	6,991,747	586,934	1,793
8.	Uttar Pradesh	12,951,670	1,129,191	7,115
9.	Madras	4,139,929	281,456	1,390
10.	Andaman & Nicobar Islands.	1,650	4,341	—
11.	Mysore	3,328,290	257,406	934
12.	Jammu & Kashmir	491,609	27,606	131
13.	West Bengal	4,256,795	439,491	328
14.	Delhi	36,725	97	211
15.	Punjab	2,420,110	222,119	7,840
16.	Tripura	1,52,688	11,949	Not available
17.	Rajasthan	3,865,073	1,33,061	—
18.	Gujarat	2,964,951	21,987	—
19.	Maharashtra	6,088,318	301,320	—
20.	All India statement of 9th Livestock Census	68,601,614	6,605,150	34,297

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Bihar Eradicates Rinderpest

By:- **Shri S K Sen**
Director
Animal Husbandry, Patna, Bihar

THERE are innumerable facets to the problem concerning improvement and development of livestock in under-developed countries like India. Among these, non-descript nature of the majority of local cattle, their low plane of nutrition and prevalence of infectious and contagious diseases of livestock have been regarded as the most universal, and of greatest economic significance to the farming community. With the initiation of the five year plans in the country, simultaneous and concerted efforts are being made to solve the afore-said problems in a systematic way. The immediate and the foremost vital problem before the nation has been the control of the ravages of Rinderpest which has been responsible, till very recently, for the largest share of the mortality among cattle. It has been estimated that nearly two to three lakhs of cattle used to die every year from the killer disease of cattle causing a very heavy loss to the nation of about Rs. 30 crores.

Rinderpest, popularly known as cattle plague and by various other names in different countries is of world-wide distribution. The ravages caused by the disease in India are known since very early times. The very name of the disease among the stock-breeders and farmers is fraught with fear on account of their helplessness against this disease. People in many parts of Bihar as elsewhere in India used to offer sacrifices in the past at the altar of Goddess to ward off the spread of disease in their herd.

The disease used to occur in some parts of State and its adjoining areas every year. But at certain intervals, the disease occured in waves of virulence causing a very wide-spread loss of livestock. One such example in recent years is the serious out break of Rinderpest in Bihar in the year 1956 which affected the districts of Monghyr, Bhagalpur, Saharsa and parts of Patna and Gaya districts, causing

serious loss to livestock and farming operations. The disease was brought under control by prompt and persistent veterinary measures.

In most of the Western countries Rinderpest has been stamped out. The great outbreaks of Rinderpest in England in 1865, led to the Cattle Disease Prevention Act of 1866 and the systematic control of livestock disease in Britain. In 1920 an out break of Rinderpest occurred in Belgium and spread to many adjoining countries. Prompt Veterinary and police measures stamped out the disease. The Royal Commission on Agriculture in India in 1928 dealt the subject at great length. After considering the measures taken to stamp out Rinderpest in Belgium, they reached the conclusion that in the then prevailing circumstances in India it was not possible to stamp out the disease. The main problems for successful eradication of Rinderpest in India on the lines of measures taken by Western countries were :—

(i) Extreme paucity of trained technical personnel to carry out the mass immunisation programme.
(ii) Non-availability of effective vaccine in large doses, and
(iii) Large bovine population of the country spread over the diverse tracts of the country including some very inaccessible and difficult terrain.

In the post-independence period, ravages caused by Rinderpest drew foremost attention and for the first time in the history of animal development in this country, a bold policy for the complete eradication of this disease from the country was laid out and a technical programme for fighting out the scourage of this dreadful disease was pressed into action. The pilot project against Rinderpest was first launched by Government of India in all the states in the South upto the river Krishna in in the year 1954. After seeing its successful results, a country-wide programme was later on launched during the Second Plan period.

Rinderpest or Cattle plague was responsible for about sixty per cent of the total mortality from all diseases among cattle in Bihar. During the month of March to September every year, all the veterinary dispensaries and hospitals used to receive S.O.S. about the out-breaks of this disease. But for want of a potent vaccine in adequate amount and a proper organisation to carry out mass vaccination in affected areas, it was too difficult to control the outbreaks of the disease on such a wide area all over the State. In earlier days, protection against the disease was accompanied by the use of serum from the cattle which had recovered from the infection, the injection of which was followed by protection for a comparatively shorter period. Later on, goat attenuated Virus Vaccine was developed and is still in use to a limited extent. It was found, however, that the passage through the goat did not render the virus sufficiently attenuated

The pilot project against rinderpest was first launched by the Government of India in all the states in the South in the year 1954. Encouraged by the success, a country-wide programme was later on launched during the Second Plan Period.

THE RINDERPEST ERADICATION PROGRAMME WAS LAUNCHED IN BIHAR IN 1956-57. ABOUT 80 PER CENT OF THE TOTAL POPULATION OF CATTLE WAS COVERED BY THE END OF THE SECOND PLAN; A TOTAL OF 154 LAKHS OF CATTLE, OUT OF 178 LAKHS WERE IMMUNISED AGAINST THIS DISEASE. BY NOW, VACCINATION HAS BEEN COMPLETED, AND FOLLOW UP PROGRAMME IS IN PROGRESS TO IMMUNISE THE LEFT-OVERS AND THE NEW CROP OF ANIMALS...

to prevent undesirable reactions in highly susceptible cattle and buffaloes. During recent years, the application of freeze drying has resulted in the conservation of virus in a suitable state of attenuation over long period, its availability on demand and easy transport in serviceable condition. Prior to the establishment of the Biological Products Section of the Department, 48 lakh dozes of vaccine were imported every year from outside the State. Now, the Biological Product Section of the Livestock Research Station, Bihar, Patna is producing the freeze-dried R.P. Virus Vaccine for immunising cattle against this disease.

The Rinderpest Eradication Programme was launched in Bihar in 1956-57 and its immunisation programme was to be completed with the end of the Second Five Year Plan. But on account of certain difficulties, the coverage was approximately 80% of the total population of cattle by that time. But by the end of the Second Five Year Plan, out of a total population of 178 lakhs of cattle in Bihar (1956 livestock census) 154 lakhs of cattle were immunised against this disease. By now, vaccination against this disease has been completed in all the districts of the State, and follow up programme is in progress to immunise the left-overs and the new crop of animals. The Animal Husbandry Department, Bihar will continue to act as a watchdog to locate any focus of infection of the disease anywhere in the State and check its entry from outside sources. Six quarantine Stations have already been set up at Harlakhi, Padma, Birpur, Sikti and Harwa Danga on the Indo-Nepal Border.

As the result of the mass vaccination of such a large number of cattle using freeze dried R.P. Virus Vaccine over the past five years the out breaks of the Rinderpest have been practically controlled in Bihar. The farmers' cattle now are no longer exposed to the dangers of this killer disease. ●

TRENDS IN ANIMAL HUSBANDRY

by
- Shri D Krishna Murty
- Shri K N Sharma

(Contd. from the Previous issue)

Age-wise distribution of bovine population:—The table in the end (Table No VI) shows the agewise distribution of the bovine population in each village. It would be observed from this table that the young stock account for 22.4% of the total bovine population and 28.4% of the adult stock are in lactation while 30.1% are pregnant. According to the Indian Livestock Statistics 1953-54 to 1955-56, the lactating animals account for 17.8% of the total bovine population in India while this figure for Uttar Pradesh is 13.5%.

Population pressure on land and concentration of livestock:—The next table (Table No. VII) shows the concentration of population and livestock on land and the area available for bullocks for draught purposes. It would be evident from this table that the total area available for cultivation in these six villages is 2219.2 acres on which 5,453 human beings and 3,970 livestock have to survive, thus leading to hardly 0.23 acres per man or his animal. Even assuming that the entire cultivable land is available for livestock hardly 0.56 acres would be available per animal with a range from 0.43 to 0.78 acres. According to Mamoria (1958) the average size of land holdings in India is 7.5 acres while in Uttar Pradesh it is 4.7 acres. In view of the varying terrain in different parts of Uttar Pradesh, the size of land holdings vary considerably and in hill areas and Bundelkhand region the size of the boldings is pretty large compared with that in

This is the Second and Final instalment of the Survey Report on the subject. This is in continuation of the report that was published in the previous issue/July 62.

the Central Jamuna-Ganga fertile region. It is, therefore, evident that the average size of holdings of cultivable land is only 0.41 acres in this region.

Usually for draught purposes, each family maintains a pair of bullocks and if there are related families, they maintain jointly a pair of bullocks. Even then, the land available for draught purposes per bullock is only 2.12 acres with an average range from 1.06 to 2.64 acres·

Milk production :—The nex table (Table No. VIII) shows the total annual production of milk in each village, the average daily production of milk per family and the average yield per adult female bovine. It would be observed from the table that on an average each family produces 5.2 lbs. of milk per day ranging from 2.7 to 7.9 lbs. and on an average each adult female bovine produces daily 6.7 lbs of milk. If all the milk produced in the villages is consumed in those areas, even then on an average, each person will get daily 13.2 oz. of milk. In one village where the dairy industry is well developed there are 1.12 lactating bovines per family and on an average in these six villages there are 0.87 lactating bovines per family.

Livestock investment:—The evaluation of livestock, income and expenditure of each family have been calculated on the basis of the voluntary replies made by each family. It was observed that there had been considerable fear and suspicion among the villagers in giving the correct data on these aspects in view of the various taxations that are imposed on them. As such there had been an over-all tendency to reduce income figures and enhance expenditure values.

The next table (Table No. IX) shows the total evaluation of livestock in each village. It would be observed that on an average Rs. 819.0 is invested per family for livestock and the total amount invested in all the six villages is Rs. 7,28,695.

Income and Expenditure :—While estimating the income of each family efforts were made to obtain details of income from individual items of marketable produce of livestock. The income due to milk was calculated at the rates of Rs. 20/- per maund taking into account of all the milk produced including the amount consumed by individual members of the family. The cost of manure was calculated at the rates of 80 nP per maund of manure assuming that each bovine on an average will produce 50 maunds of manure per year. The other items of income were based on the actual data supplied by individual farmers. The details of income excluding livestock were not worked out and only figures of total income were recorded. The next table (Table No. X) shows the details of income and expenditure. It is interesting to note that livestock industry contributes on an average 50.5% of total income and in three villages it accounts over 50% while in the remaining three it varied from 29.9 to 43.4%. The average annual income per family is Rs. 1,342.97 with an average range from Rs. 1,206.57 to Rs. 1,442.80.

It will be observed from the same table (Table No. X) that the average expenditure of each family per annum is Rs. 1,315.74 with an average range from Rs. 1,107.74 to 1,385.28. As already pointed out *loc cit*; although, the figures of income are underestimates while those of expenditure are slightly over estimates, yet on an average there is an overall saving of Rs. 27.23 per annum per family. The

expenditure on livestock accounted for 28.0% of the total ranging from 22.6 to 35.4%. These figures also indicate that there is a considerable margin of profit in livestock industry provided all the produce is marketed and the question of deficit comes up if the amount consumed by the producer is not accounted or his produce could not be marketed at reasonable price. It may be reasonable to classify those villages where livestock industry contributes to over 50% of its total income, as "predominantly animal husbandry villages" and the extension programmes in those villages may be to a large extent channelised for the development of animal husbandry.

Incidence of animal diseases:—It is interesting to note that the two major infectious diseases reported in these villages are Haemorrhagic septicaemia and Foot-and-Mouth disease. While prophylactic vaccination for the former disease is available, no specified programme is being taken up for the prevention of the later infection. Since Haemorrhagic septicaemia is a seasonal disease occurring immediately after the onset of monsoon, efforts were made during the survey to carry out mass vaccination in these villages utilising oil adjuvant vaccine. In Uttar Pradesh, this vaccine is only used for State animals and for field use only broth vaccine is issued. In the view of the experimental nature of the survey, the oil adjuvant vaccine, which affords better and longer duration of immunity than broth vaccine was used in protecting the herds in these villages. The next table (Table XI) shows the figures of mass vaccination and it would be observed from the table that 80.2% of vaccinable animals have been inoculated. As in the previous years, severe outbreaks of this disease occurred in all the adjacent villages during the months of August and September but no case of this disease occurred in these six villages.

Besides these two infectious disease, non specific conditions like infected wounds, tympanitis, impaction, diarrhoea, dysentry, debility and parasitic infestation are some of the common ailments reported.

Animal breeding problems:—As already pointed out, there had been a considerable demand in these villages for more buffalo bulls for breeding purposes and the villagers were also keen to purchase good lactating she-buffaloes.

Generally except for a few families, the villagers were not in favour of artificial insemination and they preferred natural service. Apparently considerable propaganda has to be still carried out to make this method popular and unprejudicial. Practical field demonstrations of the utility of this programme may go a long way in popularisation of this method.

Nutritional status of animals:—Although attempts have been made to elicit detailed information about the feeding procedure, nature and quantum of feeds given, yet the data gathered had not been very definite. It, however, showed that the farmers are aware of the need of feeding animals with concentrate mixture besides roughages and greens. The composition and quantity of feeds varied depending on the availability and season. It included Karbi, or bhoosa, different types of greens like cowpea, berseem, grasses as available. The concentrate mixture varied considerably and included items like gram, gram husk, barley, wheat bran and oil cakes. The working bullocks during the ploughing season and cows during lactation received

special priority from the farmers in feeding concentrates or special feeds and during heavy ploughing season, the bullocks were fed with such fancy items like ghee and juggery to provide extra nutrition. It was not possible to obtain accurate data about the amount of concentrates and roughages given as the farmers fed approximately and not based on production and that too varying considerably. Arrangements for supply of fodder and balanced concentrate mixtures, preferably on subsidised basis, may considerably reduce the chance of underfeeding of livestock. For obtaining detailed data, it is necessary to carry out detailed nutritional surveys in various seasons, the investigators themselves calculating the amount of feed given to each animal.

Suggestions made by individual families:— The farmers were questioned individually whether they have any specific problems and suggestions for improving animal husbandry in the respective villages. The most common suggestion is for a marketing organisation for supply of good animals and for sale of their produce, particularly milk. In some of the interior villages the farmers had to go for several miles on cycles to sell the milk at varying rates in irregular markets. It is interesting to note that Khoya prepared from converted milk from one village is exported all the way to Bombay through middlemen who pay a very nominal rate to the producers. In the villages they have reported of the problem of stray and wild cattle and in three villages there was the problem of grazing and supply of green fodder during summer season. Individual specific problems varied considerably including death of working or milking animals and the problem of their replacement, chronic ailments of their animals, purchase of stock, difficulty of obtaining a suitable bull for service, grazing facilities and obtaining suitable concentrate feeds at reasonable rates.

Conclusions

In this brief note attempts have been made to describe the procedure adopted in carrying out an animal husbandry survey in selected rural areas and to record the main observations on the data thus collected and analysed. This survey was carried out as part of the practical training programme in field extension work to the final year Veterinary graduate students which is probably the first of its kind in this country. From the data, it would be evident that such surveys would yield very useful information which is essentially basic for proper planning of extension programme in the animal husbandry and should be undertaken in each block before organising extension programmes. Such surveys carried out periodically would reveal the trends in animal husbandry practices and would also serve as accurate indices for accessing the success of any extension programme. Similar surveys could be undertaken not only as extension training for veterinary graduates but also for all other graduate students since they will serve as very useful media for rural practical training.

From this survey, it is apparent that the farmers in this region are only interested in bovine husbandry preferring the buffalo over the cow. There is considerable pressure on land, and on an average there is hardly 0.23 acres per livestock and man, the proportion between man and livestock being 1:0.72. There is hardly sufficient work load for the bullocks as the land available per bullock is hardly 2.4 acres. In spite of this situation, the average production of milk per lactating animal per day is 6.7 lbs. and the per capita amount of

milk available is 13.2 ozs. In three villages, animal husbandry contributes to over 50% of the total income indicating the importance of dairy industry in this area. If all the produce from livestock is accounted, animal husbandry is a profitable investment even under the present conditions in this region and with better feeding, breeding and improvements in disease control, there is ample scope for enhancing the margin of profit.

TABLE V

Showing distribution of cattle and buffaloes

Type of animal	Village					
	Umari	Nagari	Bakalpur	Bhainsa	Jachonda	Raal
Number of adult cows	78	21	17	97	84	118
Number of adult buffaloes	158	53	63	258	116	411
Ratio between cows to she-buffaloes.	1 : 2.0	1 : 2.5	1 : 3.7	1 : 2.7	1 : 1.4	1 : 3.5
Number of cow bullocks	106	46	39	159	79	269
Number of buffalo bullocks.	98	19	20	16	90	103
Ratio between buffalo bullocks to cow bullocks.	1 : 1.1	1 : 2.4	1 : 1.9	1 : 9.9	1 : 0.9	1 : 1.26

TABLE VI

Showing agewise distribution of bovine population

Nature of bovine population	Villages					
	Umari	Nagari	Bakalpur	Bhainsa	Jachonda	Raal
Total number of bovines	535	211	184	805	543	1143
Total number of adult bovine	440	139	139	530	369	901
Total number of young stock	95	72	45	275	174	244
Percentage of young stock to total bovine population.	17.7%	34.1%	24.4%	46.7%	20.9%	21.3%
Number of pregnant animals	109	36	48	160	93	271
Number of lactating animals	127	38	32	195	107	258
Percentage of lactating animals to adult bovines.	24.7%	25.8%	34.5%	30.1%	27.9%	30%
Percentage of pregnant animals adult bovines.	28.8%	27.2%	23%	36.7%	29%	28.6%

Table VII

showing concentration of population and livestock on land

	Villages					
	Umari	Nagari	Bakalpur	Bhainsa	Jachonda	Raal
Cultivable land available in each village. (in acres)	482.8	171.8	108	514.8	277.4	664.4
Total human population	999	311	350	1126	719	1948
Total number of livestock	680	219	244	938	643	1246
Average area of land available for each man and animal in acres.	.28	.32	.18	.24	.20	.21
Ratio between man and livestock	1:0.68	1:0.70	1:0.69	1:0.83	1:0.89	1:0.64
Average area of land available for each animal in acres.	0.71	0.78	0.44	0.56	0.43	0.53
Total number of working bullocks	204	65	59	175	169	372
Average area of land available for such bullock (in acres)	2.36	2.64	1.06	2.94	1.64	1.78

Table VIII

showing details of production and consumption of milk

Milk Production	Villages					
	Umari	Nagari	Bakalpur	Bhainsa	Jachonda	Raal
Total amount of milk produced per annum in lbs.	264860	92783	59122	506092	240188	500896
Average amount of milk produced per family per day in lbs.	4.2	4.3	2.7	7.9	5.4	5.0
Average number of animals per family	3.95	3.71	4.13	5.48	5.31	4.4
Average number of lactating animal per family	.73	.64	.54	1.12	.88	.91
Average amount of milk produced per lactating animal per day in lbs.	5.6	6.5	5.6	7.02	6.1	5.3
Amount of milk available per capita daily.	11.6 oz.	13.1 oz.	7.0 oz.	19.7 oz.	14.6 oz.	11.2 oz.

TABLE IX

showing details of livestock investment calculated in rupees

Nature of livestock investment	Villages					
	Umari	Nagari	Bakalpur	Bhainsa	Jachonda	Raal
Total valuation of cattle	56207	20655	16305	78345	38900	111340
Total valuation of Buffaloes	63454	17469	24225	76775	51810	123757
Total valuation of Horses	—	—	—	1650	3300	16330
Total valuation of Donkeys	—	220	150	820	200	210
Total valuation of Sheep	—	—	480	1600	720	500
Total valuation of Goats	1890	—	1900	1930	195	1250
Total valuation of Pigs	—	120	—	1240	140	850
Total valuation of Poultry	32	10	—	—	45	—
Total valuation of Camels	—	—	—	—	3200	2500
Total	121584	38474	43060	162360	96510	266737

TABLE X

showing details of income and expenditure

	Villages					
	Umari	Nagari	Bakalpur	Bhainsa	Jachonda	Raal
A—Income						
1. Cost of milk	64,600	22,630	14,420	120,997	58,582	122,170
2. Income by sale of animals.	765	—	950	1,250	250	1,980
3. Income by sale of wool	—	—	—	20	40	—
4. Income by sale of eggs	45	—	—	—	—	—
5. Income by sale of hides	100	—	—	—	—	—
6. Income by transport through animals.	50	—	—	2,050	1,500	2,000
7. Cost of manure	27,200	8,760	9,760	42,783	25,720	49,840
8. Total Income from livestock industry	92,760	31,390	25,130	160,100	96,082	175,990
9. Total income of the village	207,530	72,270	83,985	241,995	174,570	370,455
10. Percentage of total income contributed by livestock industry	44.7%	43.4%	29.9%	62.0%	55.1%	57.5%
11. Average annual income per family	1206.6	1224.2	1423.5	1415.0	1442.8	1309.1
B. Expenditure.						
1. Expenditure on livestock	43,335	24,020	21,900	83,890	42,200	86,965
2. Expenditure on other items including family expenses	147,090	46,170	60,920	152,995	110,900	287,740
3. Total expenditure	190,425	70,190	82,820	236,885	153,100	374,705
4. Average annual expenditure per family.	1107.1	1189.7	1403.7	1385.3	1265.3	1324.0
5. Percentage of expenditure of livestock out of total expenditure	22.6	34.4	26.4	35.4	27.5	23.2

TABLE XI

Showing details of mass vaccination against Haemmorrhagic septicaemia carried out

Name of the village	Number of inoculable animals	Number vaccinated	Percentage of coverage
1. Umari	343	317	92.4%
2. Nagari	94	90	95.7%
3. Bakalpur	122	118	96.7%
4. Bhainsa	313	256	81.7%
5. Jachonda	246	196	79.2%
6. Raal	823	735	89.3%
	1941	1712	88.2%

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JOWAR

by :-
Prof: G S RAJORHIA
Janata Agricultural College
Ajitmahal, (Etwah)

JOWAR (Andropogon sorghum) occupies a prominent place amongst the principal crops sown throughout India. It is cultivated almost in all the seasons of the year with reasonably high yields. Its ability to withstand considerable varieties of environmental factors makes it an ideal crop for growing in the vast tracts of land throughout the country. Its growth is rapid resulting in a good yield of grain and very large quantity of one of the choicest fodders. It is not only fed as the basal ration, but also as the sole roughage. It has been an old-age practice amongst the common farmers almost throughout the country to feed green jowar fodder to most of their farm animals as the only roughage without providing any concentrates or supplement. It has been considered to be a good maintenance ration and a most palatable feed. Apart from its anticipated nutritional soundness, it also competes with other forage crops in the economy of cultivation accompanied with high yielding capacity.

Aim

Considering the immense practical importance of Jowar as a fodder particularly in Northern India, and that feeding costs account nearly 50 to 60 percent of the total expenditure of management and upkeep of cattle, an exploratory investigation was undertaken to work out the economics of nutrient production, and feeding one head of cattle through green Jowar fodder alone.

Yield of Fodder

The yield recorded in the experiment was remarkably high on account of high soil fertility, early sowing and better management. Estimating on the lines of Crop Cutting experiments the yield of plots selected at random, the output of green fodder came to 520 Maunds with a dry matter content of 35 percent per acre. Such a high yield was associated with the following details of cultivation practice adopted on the farm in general.

Cultivation of Jowar

The following was the routine of cultivation :—

Soil

Loam, well drained.

Rotation

Berseem—Jowar (one year rotation)

Seed Bed Preparation

Soon after harvesting the Berseem crop, the field was turned with the help of one iron plough, followed by other ploughing with Deshi plough in the start of May.

Manuring

250—300 maunds of well rotten Farm Yard Manure before Palewa, spread over evenly throughout the field with approximately 50 to 60 lbs. of Nitrogen in the soil.

Sowing

Broadcasted and mixed with Deshi plough and covered with Planking (*Pata*) in the last week of May.

Seed Rate

18 seers per acre.

Variety

Type 5 for green fodder with high yields.

Irrigation

One pre-mansoon palewa before sowing, and other irrigation in the last week of June due to failure of rains.

Harvesting

Started with flowering and continued upto ripe dough stage.

Yield

520 mds. with 35% dry matter.

Experiment Performed

The feeding trials were conducted on three male buffaloes on this fodder alone. The details of the trial appear in Gosamvardhana Vol. VIII, No. 2 of May, 1960 in Hindi. Any how, for ready reference the summary of the trial is being given as follows:—

Selection of Animals

Three healthy adult male buffaloes of the same age (6 to 6½ yrs) body weight (average 680, with a range of 660 to 708 lbs.) of country breed and uniform in all the physical characteristics of the body were purchased from the market, well in advance for the experimental work.

Feeding

For a few days the animals were fed on a ration consisting of green jowar, cakes and Chuni, mineral mixture to make them uniform in respect of health and nutritional status.

They were then switched on to the preliminary experimental feeding comprising of green jowar fodder alone, with 2 ozs. of common salt per head per day. Each animal was supplied liberally with weighed amount of freshly chaffed fodder. Daily residue of feed of individual animal was recorded each morning and total dry matter consumed by the animal was thus determined to ascertain their uniformity of consumption. Representative samples of feeds and residues were also drawn daily for separate animals, to be utilised for moisture determination and subsequently for detailed analysis.

Body Weight of the Animals

Before and throughout the experimental period the body weights of the individual animals were taken on three consecutive days at 7.00 a.m. every week before supplying any feed or water to them. These body weights were then averaged to indicate the weekly body weight of the animals. The weights were

also recorded at the start and at the end of the collection period. In all animals maintained their body weight throughout the experimentation with an insignificant increase when analysed statistically.

Balance Studies

To know exactly the nutritional status of the animal in question with particular reference to energy, proteins and mineral matter the balance studies were employed. Such studies essentially involve a quantitative accounting for the intake and out go of specific substances from the animal system as a result of metabolic precesses representing a gain or loss, within short period, without sacrificing the animal. The details of the balances appear in the 'Gosamvardhana' indicated previously. Here for ready reference only the average balances of the three animals are given below.

TABLE I

Showing average balance studies in gms. per day on dry matter basis

Substance	Intake	Excretion			Balance
		Faecal	Unrinary	Total	
Nitrogen	44.9710	31.6168	10.5026	42.1196	+ 2.8516
Phosphorus	12.2155	0.8290	0.2663	8.0953	+ 4.1202
Calcium	20.947	23.3490	3.5400	26.889	— 5.9420

It would be observed from the above table that green jowar supplies the protein and phosphorus for maintenance without any increase but fails to provide requisite quantity of calcium. This calcium deficiency in the experiment was met with by providing calcium carbonate. For this another trial was run with an addition of 12 gms. calcium through Ca Co_3 daily the total intake was seen to be 34.0496 gms. with a total excretion of 33.7978 and a positive balance of +0.25 gms. per day. The availability of calcium through $CaCo_3$ was 50 percent.

Economics of Nutrient Production

Various ingredients—Total as well digestible, that could be available from the total amount of fodder were calculated with the help of the gross chemical composition of jowar and the digestibility coefficient of the nutrients. The results obtained were compared with other workers to find out their feasibility. Yield of different nutrients from one acre of jowar fodder on dry matter basis which was found have been presented in the table No. II.

The results were compared with that of Das Gupta (1952) vide Deptt. of Animal Husbandry. U.P. Leaflet No. 3, which is the only available study on jowar in relation to nutrient production. He, from an acre jowar field, obtained 450 mds. of green fodder the crude protein content of which was 3.76% on dry matter basis as compared to t.10% in the present investigation. The total yield of the Digestive Crude Protein remained almost the same in both the cases.

TABLE II

Showing yield of different nutrients per acre of jowar fodder on dry matter basis

S. N.	Nutrient	Percentage in Jowar	Total amount of nutrients available	Dig. Coff.	Digestible nutrients available in lbs.
1.	Dry Matter	35.00	14924	46.41	6926
2.	Crude Protein	4.1079	610	30.00	183
3.	Ether Extract	1.6170	241	59.28	143
4.	Crude fibre	32.93	4915	53.92	2649
5.	Nitrogen-Free extract (N.F.E.)	53.42	7972	51.07	4071
6.	Starch Equi. (S.E.)	28.91	—	—	4316
7.	Total Dig. Nutrients (T.D.N.)	48.43	—	—	7227

Data for comparison for substances other than the proteins is not available. The digestibility cofficient were in conformity with that of the other workers.

Cost of Cultivation :—

To find out the feasibility of this fodder to be an economic feed the cost of raising one acre of jowar crop was estimated. The items of expenditure have been stated in the table III below :—

TABLE III

Showing the cost of cultivation of one acre of jowar

S. No.	Operation	Number or Amount	Rate including human and cattle labour	Total cost	Remarks
1.	Ploughing	3	5.00	15.00	including sowing.
2.	Manuring	15 cart loads.	3.00	45.00	One cart with 15-20 md.
3.	Irrigation	2	4.00	8.00	One palewa & one after sowing.
4.	Seed	18 seers	13.00	6.00	
5.	Supervision	—	—	5.00	calculated for one acre on the farm
6.	Land Tax.	—	—	5.00	
7.	Harvesting	5 men	1.50	7.50	
8.	Electric Charges for chaffing.	—	—	9.00	
	TOTAL			100.50	

It was found that the total cost of production of one acre of Jowar in this case was approximately Rs. 100/- only. As such, all the nutrients which could be available from one acre of jowar presented in the table No.-II. will cost the producer Rs. 100/- only. Other workers have also reported this figure to the extent of Rs. 100/- as a cost of cultivation of one acre of jowar.

Dry Matter Consumption :

The following table represents the daily dry matter consumption of the animals during the ten days experimental trial The dry matter requirement on an average works out to be about 22 lb per 1,000 lbs of liveweight. This holds true only when the jowar fodder is fed singly to animals at its prime stage of growth.

TABLE IV

Showing the dry matter consumption of the animals on green jowar fodder alone for 10 days collection period

Day	Moisture	ANIMALS					
		A		B		C	
		D.M. Consumed in Gms.	D.M. per 1000 lbs.	D.M. Consumed in Gms.	D.M. per 1000 lbs.	D.M. Consumed in Gms.	D.M. per 1000 lbs.
1.	35.0	6705	21.10	5886	19.84	6727	22.47
2.	36.9	6811	20.14	7806	26.32	7374	24.87
3.	37.00	6594	20.74	6005	20.24	6931	23.15
4.	36.8	5564	17.50	6151	20.75	7547	25.22
5.	36.0	6700	22.01	5824	19.66	6642	22.18
6.	38.0	7843	24.67	8363	28.21	8759	29.28
7.	36.1	6609	20.78	6139	20.72	7570	25.40
8.	37.5	6950	21.88	5792	19.17	7252	26.58
9.	35.5	7046	22.16	5310	17.91	7069	23.62
10.	40.0	5912	18.44	5770	19.33	6254	20.83

Cost of feeding :

The following is the account of cost of feeding of one animal for one day on green jowar fodder alone.

1. Amount of green fodder produced = 520 mds.
2. Dry matter percentage in the feed. = 35%
3. Amount of dry matter available. $= \frac{520 \times 35}{100}$
4. Amount of dry matter calculated in lbs. (182×82) = 14924 lbs.
5. Dry matter requirement per 1000 lbs body weight. = 22 lbs.
6. The number of days for which the animal may be kept on 14924 lbs dry matter. $= \frac{14924}{22}$ 678 days
7. Cost of feeding one animal on this fodder alone for 678 days = Rs. 100/- only.
8. Cost of feeding this animal per day. $= \frac{10{,}000 \text{ n.p.}}{678 \text{ days}}$ = 15 n.p.

On Cattle Development

A Heart to Heart Talk by the Chief Editor

IT is an established fact that the role of cattle in the agricultural economy of our country still remains vital as it has been from ancient times. However, the actual condition of our cattle is very deteriorated at present.

India is a vast country and conditions prevailing are different according to the local characteristics. The cow, therefore, to be developed in different areas has to be different keeping in view the suitability of the requirements of the local conditions. It has also now been accepted that the dual purpose cow yielding sufficient quantity of milk and capable of producing healthy bullocks for motive power has to be encouraged. Ultimately, the development of a multi-purpose cow should be our aim. The specific conditions with regard to cattle development may be classified into three following categories:

(1) *The cities and the areas around*: In such areas the main utility of the cow will be as the milk giver. Primarily for milk the cows are brought to these areas. After the cows cease to yield milk, the maintenance of such cows becomes more expensive. To keep the calves and rear them up also appears relatively un-economical. For this reason, we shall have to keep cows yielding more milk. The calves will have to be reared in the neighbouring rural surroundings. Better feeds and fodder will have to be provided. All the possible efforts are to be made for increasing the milk-yield of these cows.

(2) *At short distances from urban areas* : A peasant keeps such cows that yield milk and provide bullocks for motive power for agriculture. The cow-dung and urine etc. is used as manure. This is the most important aspect of agricultural cow-keeping.

(3) *Remote forest areas*:—These areas are normally far-off from inhabitations and the means of transportation are very inadequate. The cow-keepers normally do not lead a settled life, and therefore milk production in such areas is not of primary importance to the cow-keepers. Whatever little quantity of milk is available, that is converted into *ghee*. Because of their unsettled life the agriculture is also secondary to them, and so the cow-dung and urine etc. also are not used for manurial purposes. Because of these reasons the cow-keepers in these areas are more interested in the business or trade of bullocks or cows. Their main purpose is to get healthier bullocks in larger numbers to make their earnings.

The members of Panchayats should study and analyse their local conditions and find out that what type of cow would be suitable to be kept in any specific area. In the light of the purpose they have to decide the type of the cow to be developed. Special emphasis has to be laid, thereafter, on that aspect of cow-rearing. However, it should not mean the total neglect of the other aspects. The purpose is the placing of the emphasis.

While setting up a programme for cattle development, the feed and fodder position for the animals and the feasibility of the number of cattle to be kept have to be taken into consideration. After deciding a comprehensive plan including the number of cattle to be reared, the availability of feeds and fodder and other facilities, steps should then be taken to implement the programme. The use of high quality dams for better breeding purposes is a simple and profitable way. To increase the number of good an mals in a particular area, better quality of cows may be purchased from the breeding tract and introduced in the area. If the number of animals is more than required and their rearing and maintenance become burden some, their number has to be brought down by taking weeding measures. The uneconomic animals may be reared as a responsibility of the community and further breeding from such animals should be stopped. We have to be very cautious in assuring that the increase of low-quality animals should be not only discouraged but stopped by castration and other measures. The decrepit and absolutely uneconomic cattle should be sent to Gosadans run by the official and non-official agencies.

Once we decide the purpose of cow-keeping in a particular area, the breed of the cows that would be suitable should be decided. We have dual-purpose breeds in our country and these should be made use of according to requirements. The Government of India has decided a breeding policy and our future cattle development should be in consonance with that policy. In this connection, the advice of the district livestock officer should be sought. For the better provision of feeds and fodder, efforts will have to be made. For the cattle in forest areas, the requirements should be met with tree leaves and forest plants. Proper grazing lands should be developed. For the cattle depending primarily on agricultural lands, it would be better, if crop growing is phased in such a way that necessary requirements of feeds and fodder are met. Mixed farming can also be suitably encouraged.

Cow-keeping would be relatively expensive for cow-keepers who have no land. Such cattle keepers would depend for grazing of lands of other persons should normally be

The cow to be developed in different areas has to be different keeping in view the suitability of the requirements of the local conditions. It has also now been accepted that the dual purpose cow yielding sufficient quantity of milk and capable of producing healthy bullocks for motive power has to be encouraged. Ultimately the development of a multi-purpose cow should be our aim. . . .

(*Continued from page 32*)

discouraged. However, proper scheme should be taken up for settling and rehabilitating the nomadic cattle breeders and their traditional knowledge on cow-keeping should be made use of. In the marketing of milk and cattle the services of cooperative societies may be very useful. In the country several milk supply schemes are being run by government and co-operative agencies. Fullest use of such organisation should be made. The District Livestock Officer arrange cattle fairs and markets for the sale and purchase of animals. Normally only bullocks, and heifers are brought to such fairs. Arrangement should be made for the sale and purchase of milk animals.

The programme for better breeding is of vital importance. 80% of our cows are of low-quality. Their quality and performance have to be improved. This work can be done only if the high quality animals are used for better breeding purposes. Facilities are available for the supply of high-quality bulls to the cooperative societies and village organisations. Artificial insemination centres are being opened and key-village scheme is being further implemented.

The gram-panchayat should make use of the extension facilities with regard to cattle development provided under the schemes. The calves not fit for better breeding purposes should be castrated at the proper time. The panchayats can formulate legal measures for the castration of low-quality calves. Those who do not want their calves to be castrated due to some specific reasons, provision should be made that they don't keep the cows loose.

Arrangements for the ailing and diseased animals are also very essential. Veterinary aid can be had from governmental departments. The panchayats can also make their own arrangements in this regard. The panchayat should also take care of the cattle at the spread of epidemics and contagious diseases. As soon as any case of animal having been victim of such a disease having reached the Panchayat, the Panchayat Officer should immediately report the matter to the concerned veterinary doctor and on the spot veterinary assistance should be provided with.

The dead animals should be brought only at a fixed place outside the village. The carcass utilisation improved measures should be applied. This would result in cleanliness better hygienic conditions and the wealth of the dead animals. Sometimes it is said that cow-keeping causes insanitary conditions in rural areas. The remedy suggested that of keeping the cattle outside the villages is also impractical. The more practical way of keeping the village clean would be to use the cow-dung etc. in producing mathen-gas and use it later on as manure. This would provide power and fuel to the villages and result in more hygienic conditions.

For bringing more knowledge and technical know-how in the field of cattle keeping, the Panchayat should also pay attention as still cow-keeping does not constitute a regular item on our educational curriculum. The adult education organisation can make a solid contribution in this field and the panchayats can make use of some schemes laid down by the Govt. in the field of spreading knowledge about cow-keeping.

We urge our members of panchayats in particular and the farmers and cattle keepers to study this series which we have presented in the pages of the Gosamvardhana Journals ; and to plan out the activities concerning the future improvement of cattle wealth and fullest utilisation of cattle resources.

—Y.M. PARNERKAR

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